Space Weather Forecast

Issued on Wednesday, 31 August 2022 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further M-flares (R1-R2 Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate, with three Moderate class flares, all from a sunspot region now on the far-side. The strongest of these produced a far-sided halo coronal mass ejection (CME). There are two Earth-sided sunspot regions, with one large and prominent region just west of centre in the south disc. Despite the presence of some slight complexity to its magnetic field this has remained a stable region, although this is still showing some slow growth. An eruption of a line of plasma held above the Suns surface by its magnetic field (a filament) - was observed to the south of the sunspot, and has produced a CME. This has the potential for an Earth-directed component, however analysis is still ongoing.

Solar Wind / Geomagnetic Activity: The solar wind has been elevated due to a mixture of ongoing weak CME effects from the arrival on the 29th, but also influence from the fast wind of a coronal hole. Speeds have generally been around 550 km/s, but with brief peaks to 600-650km/s. The magnetic field carried by the wind has also see brief enhancements from Weak to Moderate levels, becoming Moderately strong, Despite this, the north-south component has remained mostly weak, and mostly pointing in a northward direction. Geomagnetic activity was Quiet to Active (Kp1-4).

Energetic Particles / Solar Radiation: The count rather of energetic particles (high energy protons) has been easing to background after recent very weak enhancements, with no solar radiation storms occurring

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to fall to Low with any further Moderate flares from the far-side sunspot increasingly unlikely to be observed. There is chance, however, of isolated Moderate flares from the large sunspot in the southern centre disc, with a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs, however the CME observed on the 30th is still under analysis, with the potential for a glancing impact later in the period. Any ongoing influence from the recent CME arrival (on the 29th) is expected to ease early on the 31st, with more typical fast solar wind conditions following, originating from a coronal hole, and gradually easing through the period. There is a chance of a further enhancement from a coronal hole fast wind arriving late day 4 (3rd), however this is currently expected early day 5 (4th). Quiet to Unsettled geomagnetic activity is forecast with Active intervals possible at first. Easing to Quiet with a chance of Unsettled intervals by day 2 (1st). There is a chance of this increasing to Active to G1/Minor storm intervals, with either an early fast wind arrival towards the end of day 4 (3rd), or any impact that may occur from the filament eruption CME.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain below the Minor Radiation Storm level (S1). There remains a slight chance of further increases to or above the S1 level, from any significant flares from either of the

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large sunspots, including the one which has now rotated off the Earth-facing disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	10	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	25	25	25	25
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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